

SPECIFICATION

TITLE OF THE INVENTION

SUPERCONDUCTING FILTER APPARATUS AND WIRELESS RECEIVING AMPLIFIER

Sub Spec  
Approved  
For Entry  
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CROSS REFERENCE TO RELATED APPLICATION

The present application is a continuation of International Application No.  
PCT/JP01/01281 which was filed on February 22, 2001.

BACKGROUND OF THE INVENTION

This invention relates to a superconducting filter apparatus used at a base station in mobile communications, and to a wireless receiving amplifier having a superconducting filter. More particularly, the invention relates to a superconducting filter apparatus that is capable of rapidly detecting an abnormality in a refrigerator, and a wireless receiving amplifier having a superconducting filter.

Generally, in order to obtain a steep cut-off characteristic in a communications filter, the number of filter stages must be increased. However, a problem which arises is a commensurate increase in loss in the pass band. Accordingly, note has been taken of the fact that a superconductor has a resistance that is lower than that of ordinary metals by two to three orders of magnitude, and a superconducting filter that holds loss in the pass band to the minimum has been put into practical use employing a superconductor as the conductor of the filter. Such a superconducting filter has become the focus of much attention in recent years for the purpose of effectively utilizing frequency in mobile communications, increasing subscriber capacity and increasing base-station coverage area, etc. A known example of a superconducting material for a superconducting filter is YBCO (Y-Ba-Cu-O), which has a critical temperature ( $T_c$ ) on the order of 90 K. This material is used at a temperature  $T_c$  on the order of 70 K, which is a temperature at